SIEMENS **Preliminary data** **BSO 307 N**

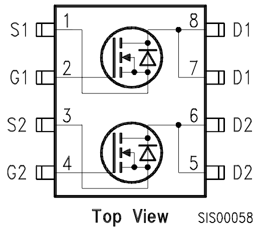
SIPMOS® Small-Signal-Transistor

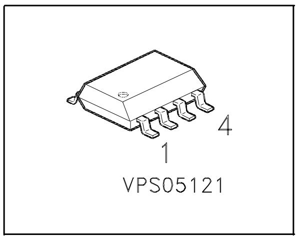
Features

- Dual N channel
- Enhancement mode
- Avalanche rated
- Logic Level
- d*v*/d*t* rated

Product Summary

Drain source voltage	V_{DS}	30	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.05	Ω
Continuous drain current	I_D	5	A





Type	Package	Ordering Code
BSO 307 N	SO 8	Q67000-S4012

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current, *one channel active* T_A = 25 °C	I_D	5	A
Pulsed drain current, *one channel active* T_A = 25 °C	I_{Dpulse}	20	
Avalanche energy, single pulse I_D = 5 A, V_{DD} = 25 V, R_{GS} = 25 Ω	E_{AS}	55	mJ
Avalanche current,periodic limited by T_{jmax}	I_{AR}	5	A
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	0.2	mJ
Reverse diode d*v*/d*t* I_S = 5 A, V_{DS} = 24 V, d*i*/d*t* = 200 A/µs, T_{jmax} = 150 °C	d*v*/d*t*	6	kV/µs
Gate source voltage	V_{GS}	±20	V
Power dissipation, *one channel active* T_A = 25 °C	P_{tot}	2	W
Operating temperature	T_j	-55...+150	°C
Storage temperature	T_{stg}	-55 ... +150	
IEC climatic category; DIN IEC 68-1		55/150/56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - soldering point	R_{thJS}	-	-	35	K/W
Thermal resistance @ 10 sec., min. footprint	$R_{th(JA)}$	-	-	100	
Thermal resistance @ 10 sec., 6 cm^2 cooling area [1]	$R_{th(JA)}$	-	-	62.5	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage V_{GS} = 0 V, I_D = 0.25 mA, T_j = 25 °C	$V_{(BR)DSS}$	30	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D = 20 µA	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS} = 30 V, V_{GS} = 0 V, T_j = 25 °C		-	0.1	1	
V_{DS} = 30 V, V_{GS} = 0 V, T_j = 150 °C		-	10	100	
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-state resistance	$R_{DS(on)}$				Ω
V_{GS} = 4.5 V, I_D = 4.1 A		-	0.05	0.075	
V_{GS} = 10 V, I_D = 5 A		-	0.035	0.05	

---

[1] Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm2 (one layer, 70µm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 4.1 A	g_{fs}	2	6	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	400	500	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	160	200	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	70	90	
Turn-on delay time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 4.1 A, R_G = 16 Ω	$t_{d(on)}$	-	22	33	ns
Rise time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 4.1 A, R_G = 16 Ω	t_r	-	22	33	ns
Turn-off delay time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 4.1 A, R_G = 16 Ω	$t_{d(off)}$	-	22	33	ns
Fall time V_{DD} = 15 V, V_{GS} = 4.5 V, I_D = 4.1 A, R_G = 16 Ω	t_f	-	25	38	ns

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

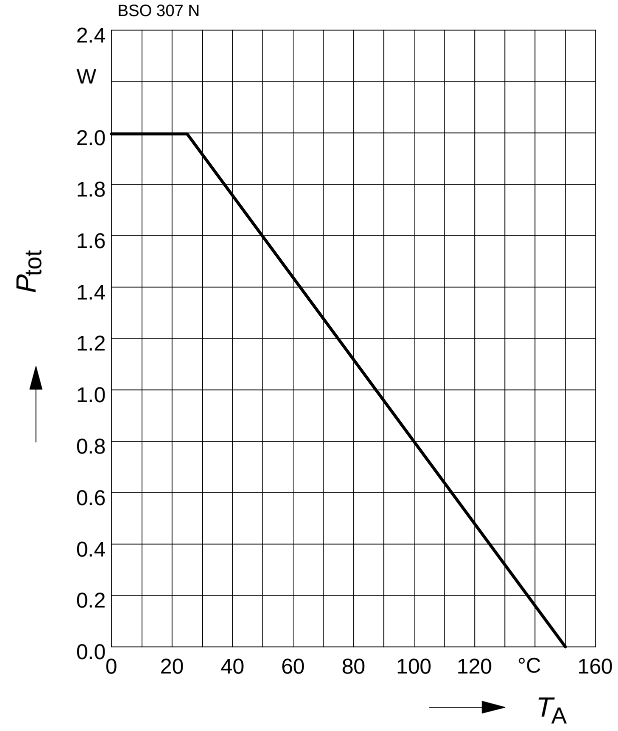
Parameter at T_j = 25 °C, unless otherwise specified	**Symbol**	**Values**			**Unit**
		min.	**typ.**	**max.**	
Dynamic Characteristics					
Gate charge at threshold V_{DD} = 15 V, I_D = 0.1 A, V_{GS} = 0 to 1 V	$Q_{G(th)}$	-	0.4	0.6	nC
Gate charge at V_{gs}=5V V_{DD} = 15 V, I_D = 4.1 A, V_{GS} = 0 to 5 V	$Q_{g(5)}$	-	8	12	
Gate charge total V_{DD} = 15 V, I_D = 4.1 A, V_{GS} = 0 to 10 V	Q_g	-	13	20	nC
Gate plateau voltage V_{DD} = 15 V, I_D = 4.1 A	$V_{(plateau)}$	-	3.2	-	V

Reverse Diode

Inverse diode continuous forward current T_A = 25 °C	I_S	-	-	5	A
Inverse diode direct current,pulsed T_A = 25 °C	I_{SM}	-	-	20	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 10 A	V_{SD}	-	0.85	1.4	V
Reverse recovery time V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	t_{rr}	-	25	38	ns
Reverse recovery charge V_R = 15 V, I_F=I_S , di_F/dt = 100 A/µs	Q_{rr}	-	20	30	µC

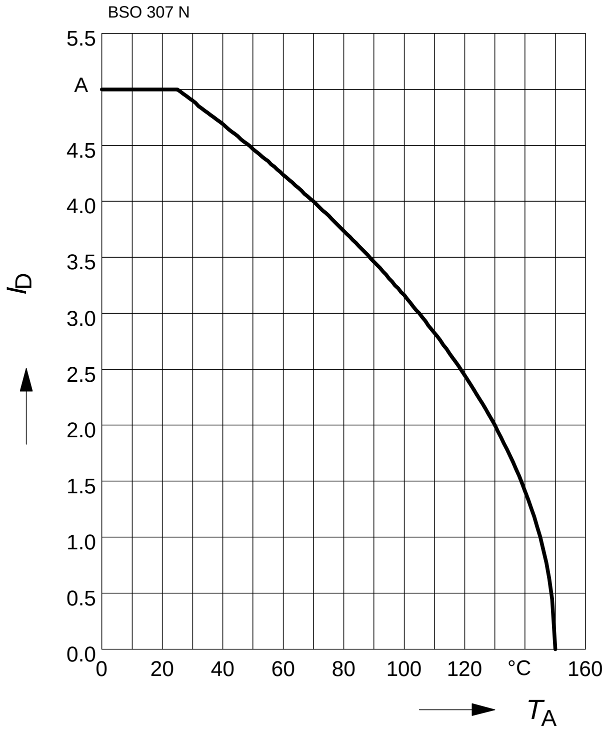
Power dissipation

$P_{tot} = f(T_A)$



Drain current

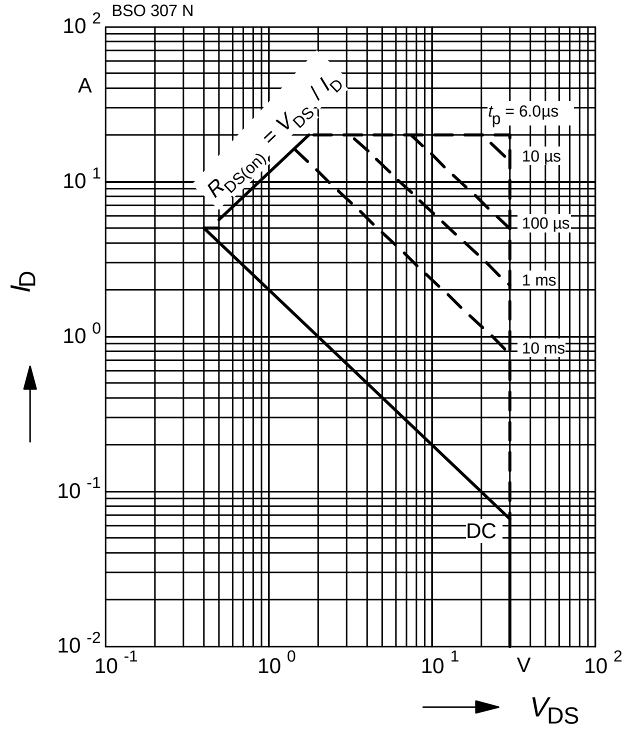
$I_D = f(T_A)$



Safe operating area

$I_D = f(V_{DS})$

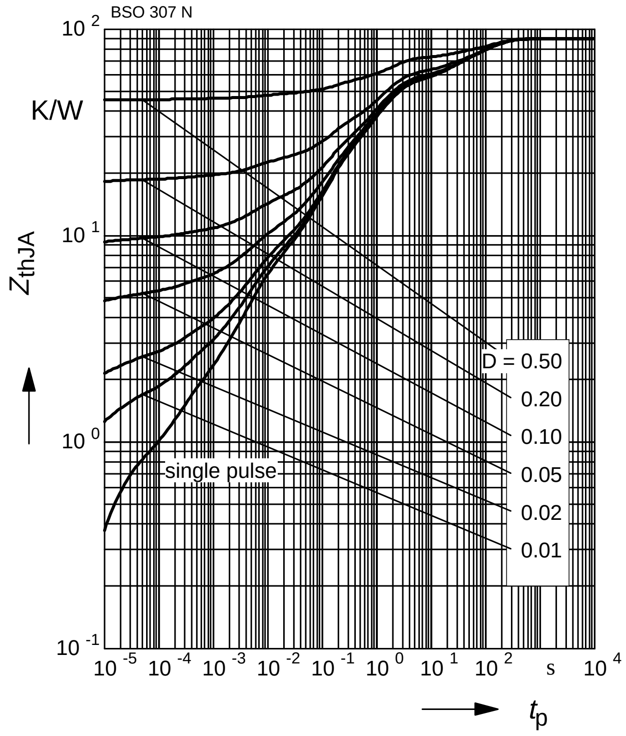
parameter : $D = 0$, $T_A = 25$ °C



Transient thermal impedance

$Z_{thJA} = f(t_p)$

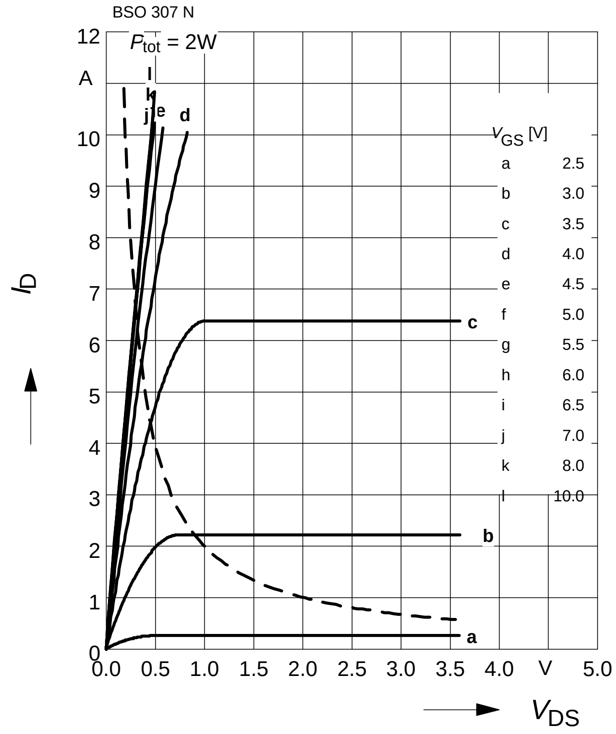
parameter : $D = t_p / T$



Typ. output characteristics

$I_D = f(V_{DS})$

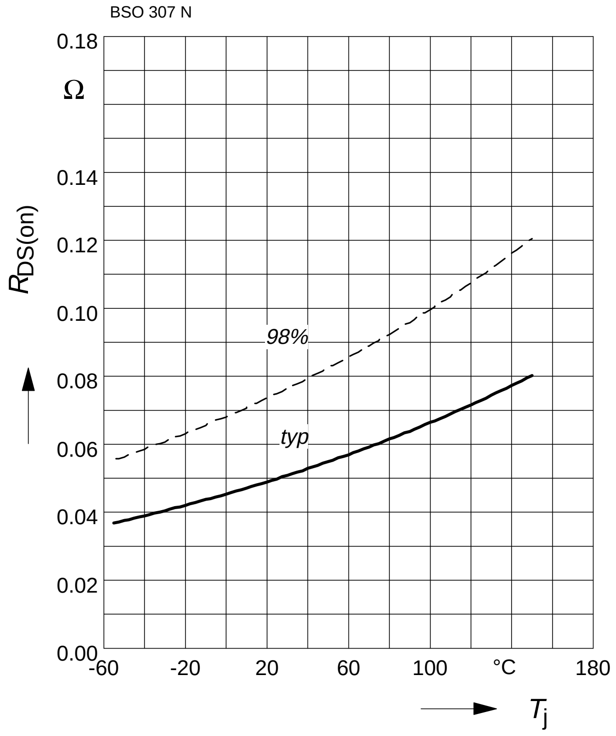
parameter: t_p = 80 µs



Drain-source on-resistance

$R_{DS(on)} = f(T_j)$

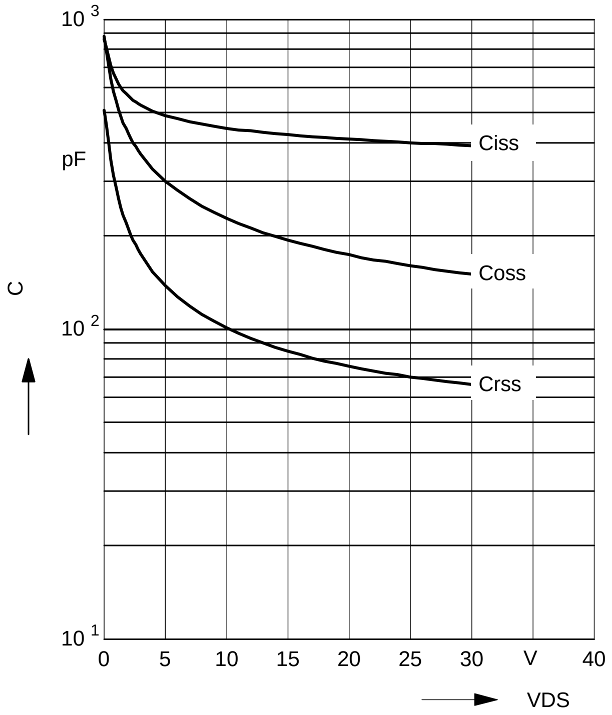
parameter : I_D = 4.1 A, V_{GS} = 4.5 V



Typ. capacitances

$C = f(V_{DS})$

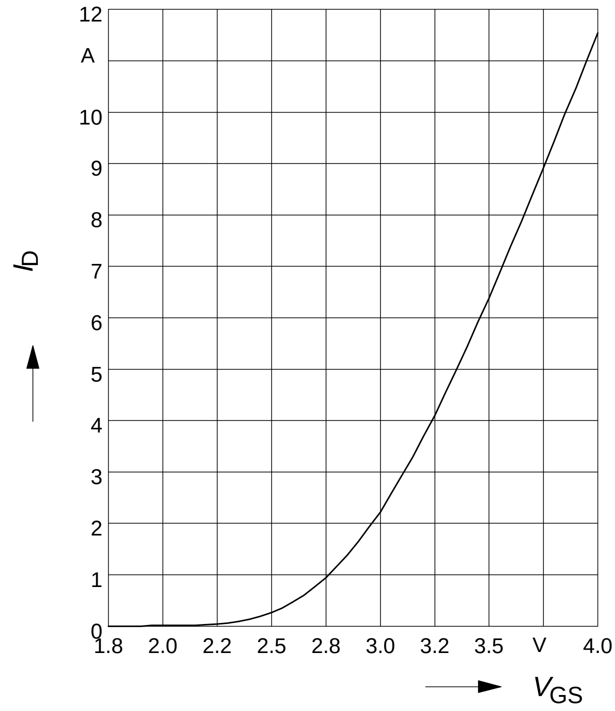
parameter: V_{GS} = 0 V, f = 1 MHz



Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: t_p = 80 µs

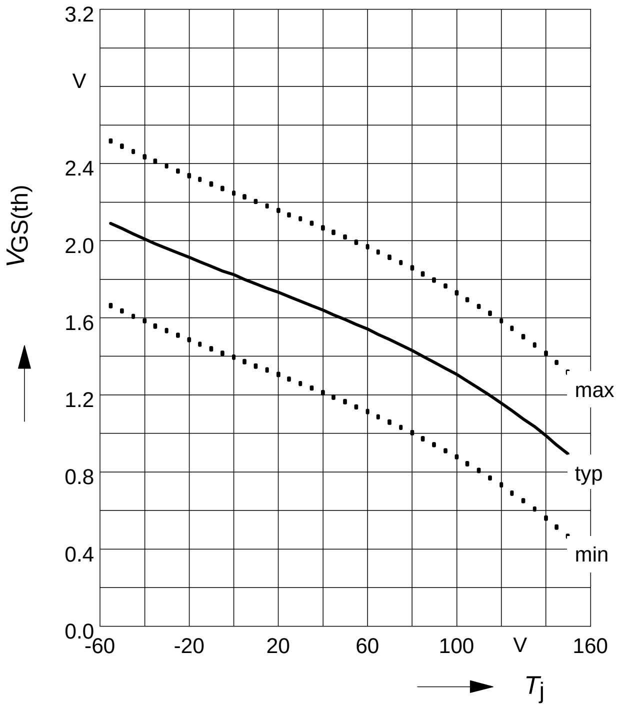
$V_{DS} \geq 2 \times I_D \times R_{DS(on)\,max}$



Gate threshold voltage

$V_{GS(th)} = f(T_j)$

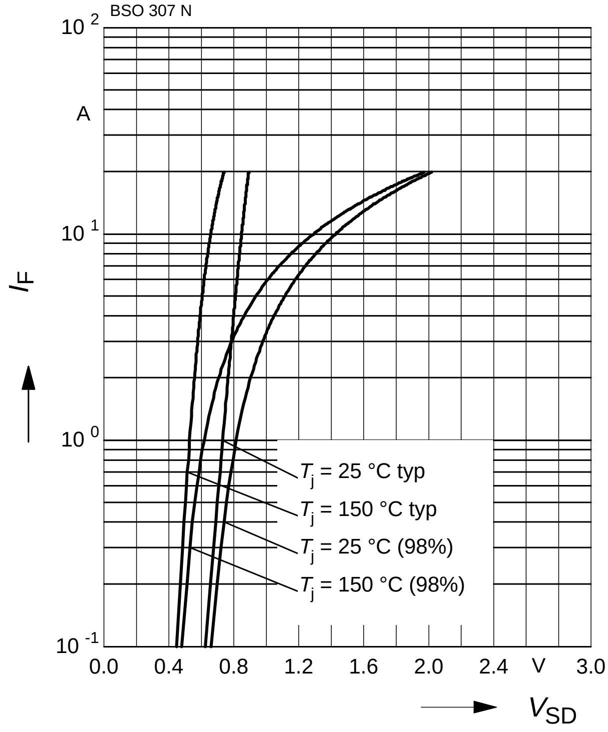
parameter : $V_{GS} = V_{DS}$, I_D = 20 µA



Forward characteristics of reverse diode

$I_F = f(V_{SD})$

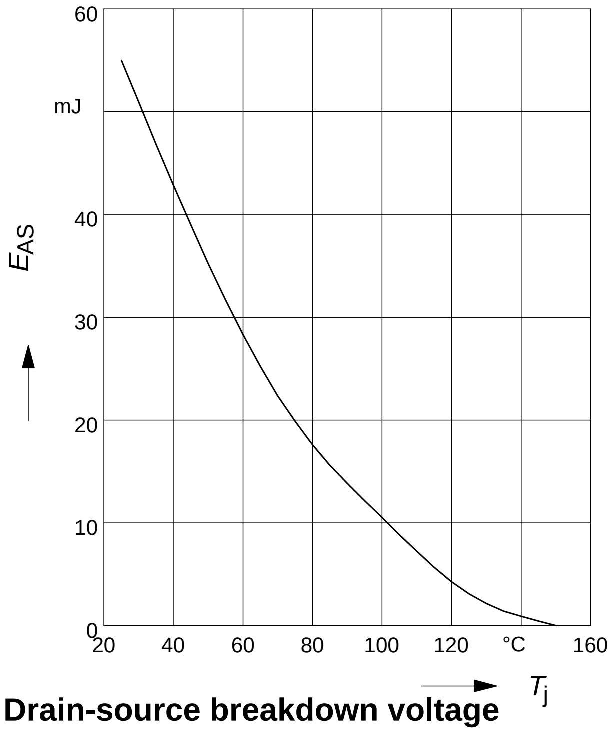
parameter: T_j , t_p = 80 µs



Avalanche Energy $E_{AS} = f(T_j)$

parameter: $I_D = 5$ A, $V_{DD} = 25$ V

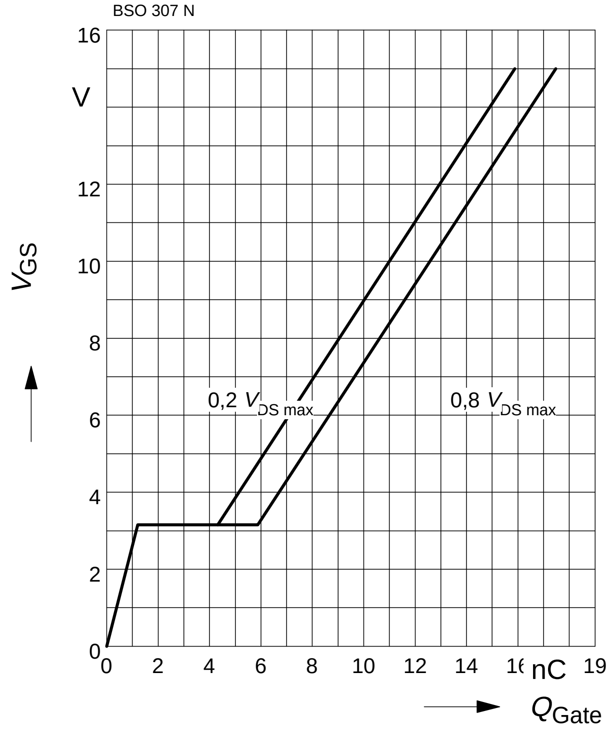
$R_{GS} = 25\ \Omega$



Typ. gate charge

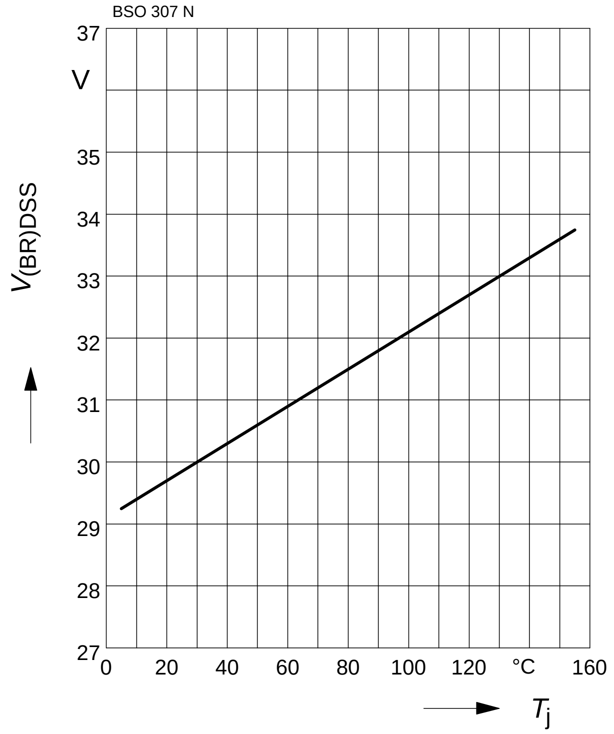
$V_{GS} = f(Q_{Gate})$

parameter: $I_{D\ puls} = 4.1$ A



Drain-source breakdown voltage

$V_{(BR)DSS} = f(T_j)$



Edition 01 / 1999
Published by Siemens AG,
Bereich Halbleiter Vetrieb,
Werbung, Balanstraße 73,
81541 München

Packing
Please use the recycling operators known to you. We can also help you - get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

Components used in life-support devices or systems must be expressly authorized for such purpose!
Critical components[1] of the Semiconductor Group of Siemens AG, may only be used in life-support devices or systems[2] with the express written approval of the Semiconductor Group of Siemens AG.

1)A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.
2)Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain and/or protecf human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.